UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/602,706	06/25/2003	Yasuhiro Yoneda	239514US90	9995

23373 7590 05/16/2007

SUGHRUE MION, PLLC
2100 PENNSYLVANIA AVENUE, N.W.
SUITE 800
WASHINGTON, DC 20037

EXAMINER	
DEHGHAN, QUEENIE S	

ART UNIT	PAPER NUMBER
1731	

MAIL DATE	DELIVERY MODE
05/16/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/602,706	YONEDA ET AL.	
	Examiner	Art Unit	
	Queenie Dehghan	1731	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *28 February 2007*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-11 and 16* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-11 and 16* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 103

The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

1. Claims 1, 6 and 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Takagi et al. (5,817,161) in view of Nomura (5,188,650) and Sato (4,591,373). Regarding claim 1, Takagi et al. disclose a method for manufacturing optical elements comprising: an upper and lower mold (col.2 line 54), where at least one of molds is vertically movable (col. 3 lines 7-8, 13-14) and has a shape such that when the glass material (1) is in contact with the upper and lower mold, a molding surface of one of the molds forms a closed space (3b) with a surface of the glass material (col. 3 lines 34-35 Fig. 1 & 8). Takagi et al. further disclose heating the glass material by thermal conduction by contacting with the upper or lower molds on the side on which the space is formed (col. 3 lines 36-38). Also, Takagi et al. disclose moving the mold for a distance h micrometers after the glass material has come in contact with the upper and lower molds (col. 2 line 66 to col. 3 line 2, lines 50-53,col. 5 lines 44-46), when a temperature of the pressing mold is at a temperature in which the glass material exhibits a viscosity of $10^{10.2}$ poises and wherein a maximum height of the space in the direction of the moving of the movable mold is denoted as h micrometers (col. 5 lines 44-49). Takagi et al. disclose the pressing method as a single pressing step or a single cycle,

where the pressurizing pattern is performed continuously, and the pressing step causes discharge of the gas from the closed space, as depicted in figure 2 (col. 3 lines 40-53). Takagi et al. also disclose supplying a glass material that has not been preheated, which apparently is at a temperature of less than a temperature at which the glass material exhibits a viscosity of 10^{11} poises, between the upper and lower mold (col. 5 lines 22-39). Furthermore, Nomura teach of a vertically slidable mold used for pressing optical elements (col. 2 lines 48-52), where glass material is supplied at a temperature less than a temperature at which the glass material exhibits a viscosity of 10^{11} poises (col. 4 lines 31-36). However, Takagi et al. fail to teach of a moving rate of the mold while pressing. Sato teaches several variables to consider while pressing optical elements with the desired surface accuracy, including the moving speed of the mold of 0.5-2μm/sec (0.12mm/min) (col. 1 lines 33-63). It would have been obvious to one of ordinary skill in the art at the time the invention was made to the press molding speed of Sato in the process of Takagi et al. in order to better control the accuracy of the optical element when molding, as taught by Sato.

2. Regarding claim 6, in addition to the elements covered in claim 1, Takagi et al. disclose a glass material that is essentially not in a softened state and pressing the glass material when it has reached a temperature such that the viscosity of the glass material is within the range of $10^{7.4}$ to $10^{10.5}$ poise, but fail to teach a temperature difference between the outer surface of the glass and the interior of the glass. However, since Takagi et al. disclose the necessary step of heating up the glass material through contact with the molds, one of ordinary skill in the art would expect the

outer surface of the glass material to be higher than the interior of the glass material when at a temperature in which the glass material exhibits a viscosity of $10^{10.2}$poise since it is the outer surface that is in contact with the heat source. Furthermore, Nomura teaches the expected temperature difference between the outer surface and interior of a glass material when placed into a mold for pressing (col. 2 line 67 to col. 3 line 3). It would have been obvious to one of ordinary skill in the art at the time the invention was made to expect a higher outer surface temperature than the interior of the glass material at the beginning of the pressing step of Takagi et al., as suggested by Nomura, because a cooler glass material being heated from thermal conduction would naturally heat up from the outer surface and work towards the central portion of the glass.

3. Regarding claim 16, Takagi et al. disclose a single pressing cycle comprising of a pressurizing pattern, wherein gas is discharged during the beginning of the pressing cycle in figure 2.

4. Claim 7 is rejected under 35 U.S.C. 103(a) as being unpatentable over Takagi et al. (5,817,161) in view of Nomura (5,188,650) and Sato (4,591,373), as applied to claim 6 above, and in further view of Marechal et al. or Hirota et al. (6,918,267). Nomura teaches preheating the glass material prior to supplying it to the mold (col. 4 lines 32-36). However, both Nomura and Takagi et al. fail to teach supplying glass at a temperature with a corresponding viscosity in the range of $10^{7.4}$ to $10^{10.5}$ poises. Marechal et al. teach supplying glass material that has been heated to a temperature such that it exhibits a viscosity about 10^{8} to 10^{10} poises (col. 3 lines 57-60, 63-64, col. 4

lines 54-56). Hirota et al. disclose the preheating of glass material to a temperature in which the glass material exhibits a viscosity of 10^8 poise (col. 10 lines 50-66). It would have been obvious to one of ordinary skill in the art at the time the invention was made to utilize the preheating step of Marechal et al. or Hirota et al. in the processes of Takagi et al., Nomura, and Sato in order to promote surface accuracy, as taught by Hirota et al.

5. Claims 2 and 8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Takagi et al. (5,817,161) in view of Nomura (5,188,650), Sato (4,591,373), and Marechal et al. (4,481,023) or Hirota et al. (6,918,267), as applied to claims 1 and 7 above, and in further view of Kataoka et al. (5,904,747). Takagi et al. teach a mold with a concave surface that forms the closed space in Fig. 1 and 8, but do not mention the radius of curvature. Takagi et al. also teach a press molding process comprising of several pressing stages in order to prevent surface deformations on the optical element due to the buildup pressure in the closed spaces. Kataoka et al. present a solution to preventing the surface deformation on the optically functional area of the optical element but using a glass material with a radius of curvature larger than the radius of curvature of the molding surfaces. Hence, Kataoka et al. teach of a mold with concave surface with a radius of curvature r1 that is smaller than the radius of curvature of the glass material, which has a convex surface, which forms the closed space with the mold in figure 7. It would have been obvious to one of ordinary skill in the art at the time the invention was made to utilize the radius of curvature of Kataoka et al. in the process of Takagi et al., Nomura, Sato, Marechal et al., and Hirota et al., in order to limit flaws in

the optical element to a perimeter outside of the non-functional optical area, as taught by Kataoka et al.

6. Claims 3, 4, 9 and 10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Takagi et al. (5,817,161) in view of Nomura (5,188,650), Sato (4,591,373), Marechal et al. (4,481,023), and Hirota et al. (6,918,267), as applied to claims 2 and 8 above. Takagi et al. disclose applying a pressure on the mold to press the glass after being in contact with the upper and lower molds and traveling a distance of h micrometers (col. 5 lines 42-49). Takagi et al. further apply a second pressure to the glass, but the pressure is not of increasing value (col. 6lines 15-16). Nomura teach increasing the pressure applied to a glass material while in the molding process, wherein a first pressure of 50kgf/cm^2 was increased to 120kgf/cm^2 after 30 seconds (and after traveling a certain distance) and further increased to 200kgf/cm^2 after another 60 seconds (Figure 4 and col. 5 lines 3-8, 41-4, 57-59). The increasing pressure rate from 50kgf/cm^2 to 120kgf/cm^2 after 30 seconds and to 200kgf/cm^2 after 60 seconds can be calculated as follows:

(120kgf/cm^2 - 50kgf/cm^2)/30 seconds = 2.3 kgf/cm^2 per second

or 0.023 kgf/mm^2 per second

(200kgf/cm^2 - 120kgf/cm^2)/60 seconds = 1.3 kgf/cm^2 per second

or 0.013 kgf/mm^2 per second

It can be seen that the increasing pressure rate is less than 0.5 kg/mm^2 per second. It would have been obvious to one of ordinary skill in the art at the time the invention was made to utilize the increasing pressure rate of Nomura in the process of Takagi et al.,

Sato, Marechal et al., and Hirota et al. in order to accommodate for the increasing temperature of the interior of the glass material while heating on the mold, as taught by Nomura.

7. Claims 5 and 11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Takagi et al. (5,817,161) in view of Nomura (5,188,650), Sato (4,591,373), Marechal et al. (4,481,023), and Hirota et al. (6,918,267), as applied to claims 4 and 10 above. Takagi et al. disclose a two step pressing method where the glass has been pressed while the mold has move a distance h (col. 5 lines 44-49) followed by a pause in pressure (col. 5 lines 56-57), indicating a moving rate of the mold to be zero and then resume moving the mold again to continue pressing the glass material (col. 6 lines 15-20) indicating an increase in the moving rate of the mold (from zero to moving) after the mold has moved a distance h.

Response to Arguments

8. Applicant's arguments filed February 28, 2007 have been fully considered but they are not persuasive.

9. In response to applicant's argument with respect to Takagi et al., as mentioned above, the pressurizing pattern that Takagi et al. employs is a single continuous pressing step. Furthermore, gas is discharged by the movement of the mold.

10. In response to applicant's argument with respect to Nomura, Nomura was not used to address the issue of trapped gas, since Takagi et al. had already done so, but

instead to used teaching the preheating of the glass to be molded and the difference in temperature between the outside and interior of the glass to be molded.

11. In response to applicant's argument with respect to Sato, Sato was not used to address the issue of trapped gas, since Takagi et al. had already done so. Furthermore, the applicant presents a graph that presumably depicts Sato's pressing method. It is unclear how the applicant came to derive changing rate of the movement of the mold of Sato relative to time. The graph is merely a speculation and is not persuasive. Also, Sato was not used to teach the viscosities of the glass material.

12. In response to the applicant's argument to claim 7, Marechal et al. and Hirota teach heating of the outer surface of the glass prior to supplying the glass to the mold. One of ordinary skill in the art would know that do so is one of many ways to reduce processing time in press molding. Hirota even points out the high productivity level and accurate production of optical elements due to the preheating of the glass (col. 2 lines 1-6).

13. In response to the applicant's argument to Kataoka, Kataoka is concerned with the surface deformation of the optical element, which is why the mold a smaller radius of curvature was taught.

14. In response to the applicant's argument with respect to claims 14 and 15, the argument is moot since the claims have been cancelled.

Conclusion

15. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. It is further noted that similar to Takagi et al., Hirota et al. (4,915,720) also teach molding glass articles with a mold temperature, such that the glass has a viscosity in a range of 10^8 to $10^{9.5}$ poises and that glass with a viscosity of $10^{10.5}$ to 10^{12} poises can only be pressed a few micrometers (col. 2 lines 47-49, 63-64). Also, both Shigyo et al. (5,173,100) and Izumitani et al. (4,738,703) teach of a distance that the mold is moved while pressing glass is in the order of microns (col. 2 lines 41-42, col. 3 lines 30-32, respectively) and that it can be controlled by a flange meeting the mold (Shigyo et al. col. 5 lines 25-27).

16. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of

the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Queenie Dehghan whose telephone number is (571)272-8209. The examiner can normally be reached on Monday through Friday 8:30am - 5:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Steven Griffin can be reached on 571-272-1189. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

STEVEN P. GRIFFIN
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 1700

Q Dehghan